In re Patent Application of
NORDSTROM ET AL.
Serial No. **09/555,816**
Filed: **OCTOBER 10, 2000**

In the Claims:

This listing of claims replaces all prior versions and listing of claims in the application.

Claims 1-23. (cancelled).

24. (new) A data scrambler, for use in a multi-carrier transmission system in which synchronization frame data is periodically transmitted from a transmitter to a receiver to measure transmission channel characteristics, the data scrambler comprising a combiner unit to combine user data with frame synchronization data.

25. (new) A data scrambler as claimed in Claim 24, wherein the combiner unit comprises an exclusive OR (XOR) combiner unit.

26. (new) A data scrambler as claimed in Claim 24, wherein the frame synchronization data is pseudo-random.

27. (new) A data scrambler as claimed in Claim 24, wherein the combiner unit combines the user data with the two most significant bits of a synchronization frame of the frame synchronization data.

28. (new) A data descrambler, for use in a multi-carrier transmission system in which synchronization frame data is periodically transmitted from a transmitter to a

receiver to measure transmission channel characteristics, and transmitted data is scrambled using a data scrambler comprising a first combiner unit to combine user data with frame synchronization data, the data descrambler comprising a second combiner unit to combine received data with frame synchronization data.

29. (new) A data descrambler as claimed in Claim 28, wherein the second combiner unit comprises an exclusive OR (XOR) combiner unit.

30. (new) A data descrambler as claimed in Claim 28, wherein the frame synchronization data is pseudo-random.

31. (new) A data descrambler as claimed in Claim 28, wherein the second combiner unit combines the received data with the two most significant bits of a synchronization frame of the frame synchronization data.

32. (new) A multi-carrier transmission system comprising:

a receiver;

a transmitter to periodically transmit synchronization frame data to the receiver to measure transmission channel characteristics; and

a data scrambler connected to the transmitter and comprising a combiner unit to combine user data with frame synchronization data.

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33. (new) A multi-carrier transmission system as claimed in Claim 32, further comprising a data descrambler connected to the receiver and comprising a second combiner unit to combine received data with frame synchronization data.

34. (new) A multi-carrier transmission system as claimed in Claim 32, wherein said multi-carrier transmission system is a discrete multi-tone (DMT) system.

35. (new) A multi-carrier transmission system as claimed in Claim 32, wherein said multi-carrier transmission system is an orthogonal frequency division multiplex (OFDM) system.

36. (new) A multi-carrier transmission system as claimed in Claim 32 further comprising means for transmitting frame synchronization data from the data scrambler to the data descrambler.

37. (Original) A method of scrambling user data prior to transmission in a multi-carrier transmission system in which synchronization frame data is periodically transmitted from a transmitter to a receiver to measure transmission channel characteristics, the method comprising:

combining user data with frame synchronization data to define scrambled data; and

transmitting the scrambled data to the receiver.

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38. (new) A method as claimed in Claim 37, wherein combining user data with frame synchronization data comprises performing an exclusive OR (XOR) operation.

39. (new) A method as claimed in Claim 37, wherein the frame synchronization data is pseudo-random.

40. (new) A method as claimed in Claim 37, wherein combining user data with frame synchronization data comprises combining the two most significant bits of a synchronization frame.

41. (new) A method of descrambling scrambled data in a multi-carrier transmission system in which synchronization frame data is periodically transmitted from a transmitter to a receiver to measure transmission channel characteristics, the scrambled data comprising user data having been combined with frame synchronization data, the method comprising:

receiving the scrambled data; and

combining the scrambled data with frame synchronization data.

42. (new) A method as claimed in Claim 41, wherein combining scrambled data with frame synchronization data comprises performing an exclusive OR (XOR) operation.

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43. (new) A method as claimed in Claim 41, wherein the frame synchronization data is pseudo-random.

44. (new) A method as claimed in Claim 41, wherein combining scrambled data with frame synchronization data comprises combining the two most significant bits of a synchronization frame.

45. (new) A method as claimed in Claim 41, wherein the multi-carrier transmission system is a discrete multi-tone (DMT) system.

46. (new) A method as claimed in Claim 41, wherein said multi-carrier transmission system is an orthogonal frequency division multiplex (OFDM) system..